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IS 7719 (1975): Metallic spiral wound gaskets [MED 30: Gaskets and Packing]

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IS : 7719 - 1975

Indian Standard

SPECIFICATION FOR METALLIC SPIRAL WOUND GASKETS

Gaskets and Packings Sectional Committee, EDC 58; Gaskets for General Engineering Purposes Subcommittee, EDC 58 : 1 [Ref : Doc : EDC 58 (2020)]

1. Scope — Specifies the dimensions, tolerances, material and general requirements for metallic spiral wound gaskets for use in flange joints having flat or raised faces.

1.1 The gaskets specified are for use with flanges of the following classes in nominal pipe sizes 10 mm to 600 mm and broadly classified under six different pressure ratings:

a) For pressures up to and including 1 MPa* — Class 10
b) For pressures above 1 MPa to 2 MPa — Class 20
c) For pressures above 2 MPa to 4 MPa — Class 40
d) For pressures above 4 MPa to 6 MPa — Class 60
e) For pressures above 6 MPa to 10 MPa — Class 100
f) For pressures above 10 MPa to 17·5 MPa — Class 175

1.2 Appendix A contains alternate gasket and centering ring sizes to suit pipes and flanges to DIN specifications for information only.

2. Dimensions and Tolerances

2.1 The gasket and centering ring dimensions shall be in accordance with Table 1 read with Fig. 1 unless otherwise specified by the purchaser. The thickness of the metal strip shall be between 0·17 to 0·23 mm. Generally the asbestos strip thickness shall be twice that of the metal strip thickness.

2.2 The tolerances on the dimensions of spiral wound gaskets shall be as follows :

	Centering Ring	*Sealing Element*
Outside diameter	− 0·8 mm	± 0·4 mm
Inside diameter	± 0·4 mm	± 0·4 mm
Thickness	$^{+0.25}_{-0.10}$ mm	$^{+0.25}_{-0}$ mm

TABLE 1 GASKET AND CENTERING RING SIZES

(*Clause* 2.1)

All dimensions in millimetres.

Nominal Pipe Size	Inner Diameter of Gasket for		Outer Diameter of Gasket for	Outer Diameter of Centering Ring for					
	Class 10	Class 20 to 175	All Classes	Class 10	Class 20	Class 40	Class 60	Class 100	Class 175
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
10	19·1*	19·1*	31·8	47·6	54·0	54·0	54·0	63·5	63·5
20	27·0*	25·4*	39·7	57·2	66·7	66·7	66·7	69·9	69·9
25	33·3*	31·8*	47·6	66·7	73·0	73·0	73·0	79·4	79·4
32	46·0*	44·5*	60·3	76·2	82·6	82·6	82·6	88·9	88·9
40	54·0	50·8*	69·9	85·7	95·3	95·3	95·3	98·4	98·4
50	69·9	66·7	85·7	104·8	111·1	111·1	111·1	142·9	142·9
65	82·6	79·4	98·4	123·8	130·2	130·2	130·2	165·1	165·1
80	101·6	95·3	120·7	136·5	149·2	149·2	149 2	168·3	174·6
100	127·0	120·7	149·2	174·6	181·0	177·8	193·7	206·4	209·6
125	154·0	149·6	177·8	196·9	215·9	212·7	241·3	247·7	254·0
150	181·0	174·6	209·6	222·3	250·8	247·7	266·7	288·9	282·6
200	231·8	225·4	263·5	279·4	308·0	304·8	320·7	358·8	352·4
250	287·3	281·0	317·5	339·7	362·0	358·8	400·1	435·0	435·0
300	339·7	333·4	374·7	409·6	422·3	419·1	457·2	498·5	520·7
350	371·5	365·1	406·4	450·9	485·8	482·6	492·1	520·7	577·9
400	422·3	415·9	463·6	514·4	539·8	536·6	565·2	574·7	641·4
500	527·1	520·7	577·9	606·4	654·1	647·7	682·6	698·5	755·7
600	631·8	625·5	685·8	717·6	774·7	768·4	790·6	838·2	901·7

Note — For those gaskets without the centering ring, the inner diameter and outer diameter are not specified. They shall be made as per the requirements of the purchaser.

*These gasket dimensions are not suitable for use with slip on or screwed flanges.

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*1MPa = 1 MN/m² ≈ 10 bar

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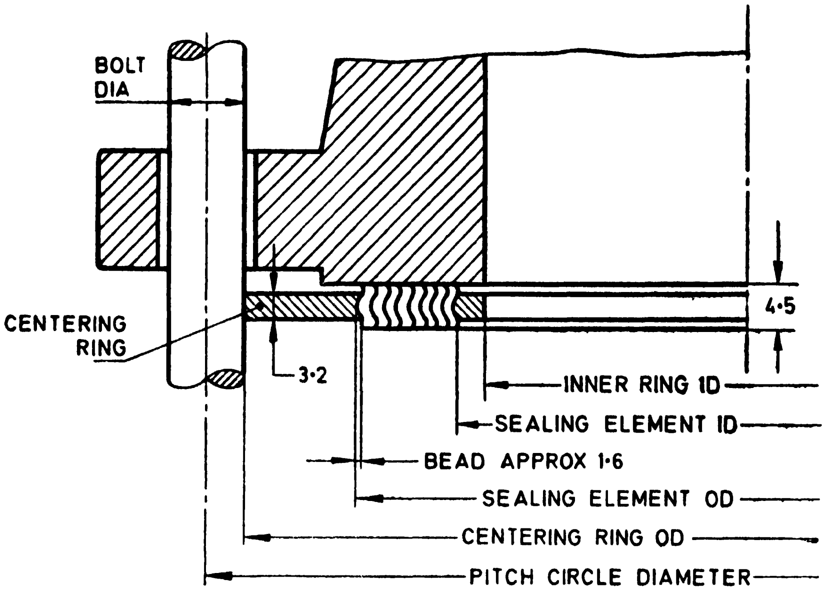

All dimensions in millimetres.

FIG. 1 DIMENSIONS FOR METALLIC SPIRAL WOUND GASKET

3. Material

3.1 The metal winding of the gasket shall be made of materials given in Table 2 according to the temperature requirements of the flange joint, unless specified otherwise by the purchaser. The strip shall have sufficient resilience to take up different gasket loadings.

3.2 The centering ring shall be made of annealed carbon steel, having a minimum tensile strength of 420 MPa unless otherwise specified by the purchaser. This shall be suitably plated to prevent rusting.

TABLE 2 METAL WINDING MATERIAL

(*Clauses* 3.1, 7.2 *and* 7.4)

Indian Standard	Grade/Symbol	Temperature of Fluid	Colour Code
(1)	(2)	(3)	(4)
4030	Plated cold rolled carbon steel	Up to 260°C	Yellow
1570	07Cr19 Ni9	From 260°C to 455°C	Red
1570	05Cr18 Ni11 Mo3 07Cr19 Ni9 Nb70	From 455°C to 732°C	Blue
—	Nickel alloy of chemical composition [79·5%Ni, 13%Cr, 0·08%C (*Max*)]	From 732°C to 1030°C	White

3.3 The filler material, in general, shall be of the best quality long fibre asbestos blended with suitable binders for the class rating under which the gaskets are manufactured. Other materials, such as Teflon may be used, if specified by the purchaser.

4. General Requirements

4.1 The spiral wound gasket shall be made of a continuous strip of preformed metal, wound spirally from inside to outside with filler material between each ply. After completion of the winding the filler material shall be flush with and in no case below the metal winding at the gasket contact surfaces.

4.2 At least three initial turns and three final turns of the spiral metal strip shall be wound without the filler material and shall be firmly secured by welding.

4.3 The shape of the preformed metal strip shall be either in V form or U form, unless otherwise specified by the purchaser. The number of plies, pitch of the spiral and thickness of filler material are not specified in this standard, but shall in general be suitable for pressure ratings as classified in **1.2**.

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TO
IS : 7719-1975 SPECIFICATION FOR METALLIC SPIRAL WOUND GASKETS

Alterations

(*Page* 2, *clause* **3.1**) — Delete the sentence ' The strip shall have sufficient resilience to take up different gasket loadings. '

(*Page* 3, *clause* **5.1**) — Delete the existing clause and incorporate the following as clause **5.1**:

'**5.1** The sample taken from a batch of 12 numbers will be tested to the class rating pressure and temperature. The compression test load for all standard flange gaskets shall be calculated using bolt stress of 210 MPa at the root area. However, for non-standard gaskets, customer will have to specify the number of and size of bolts used in the joints. The load during the compression test for these gaskets will have to be calculated by the manufacturer based on this information.

Procedure for Compression Test — The test shall consist of subjecting the gasket to compression in a hydraulic compression machine of suitable capacity to cover the various standard flange sizes measuring thickness of the gasket while the gasket is under test load.

The gasket shall be tested between steel test plates, the surfaces of which have smooth finish maintained with a circular lay (concentric or phonographic) having a roughness of not exceeding 12·5 microns. The test plate shall be centrally located in the ball and socket head of the machine. 4 dial indicators having a minimum scale of deviation of 0·02 mm located at 90° apart mounted on the upper compression plate are to be employed for measuring the thickness of the gasket. These dial indicators are also to be used for indicating the uncompressed thickness of the gasket.

During testing, increments of the load shall be applied until the load corresponding to the test load calculated is reached. The maximum rate of loading shall be about 900 kg/sec. The specified load shall be maintained only for sufficient time (5 or 10 secs) to obtain the dial indicator readings. The average of 4 dial indicator reading shall be considered to be the compressed thickness of the gasket.

After completion of the test, the load shall be released but the upper compression plate shall be left in contact with the gasket for approximately 10 secs and the dial indicator reading shall be taken to determine the recovery of the gasket.

The type of the test failures based on which the gaskets will be rejected are:

a) The gasket buckling at the inner periphery to the extent that metal plies are separated.

b) Welding both at outside and inside have failed.

The initial thickness and compressed thickness shall be as shown below:

Initial Thickness	*Compressed Thickness as Specified Load*	*Compression Range*	*Recovery*
mm	mm	mm	
3·125 ± 0·125	2·36 ± 0·125	0·64 to 0·89	0·125
4·5 ± 0·125	3·35 ± 0·125	1·03 to 1·28	0·25 '

(EDC 58)

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4.4 Gaskets for use with joints having raised or flat face will have a steel centering ring in one piece around the spiral gaskets, this being designèd such that the gasket fits into this ring in such a manner, that it will not drop out of the centering ring during normal handling.

4.5 Refill gaskets for joints mentioned in **4.4** may be made without the centering ring if specifically requested by the purchaser.

5. Tests

5.1 One sample taken from a batch of 12 numbers will be tested to the class rating pressure and temperature. A bolt loading of 210 MPa shall be applied and the compression of the gasket shall not exceed 1·0 mm. Under the above conditions the gasket shall hold the pressure inside satisfactorily.

5.2 If one gasket fails in a test as outlined in **5.1**, one more gasket shall be subjected to a similar test. If that also fails the whole batch of 12 numbers shall be rejected.

6. Packing

6.1 The gaskets shall be enclosed in moisture resistant wrappings and packed in such a manner as to prevent damage in transit or during storage.

7. Identification and Marking

7.1 The gasket centering ring shall be stamped using symbols approximately 3 mm high with the following:

a) Nominal pipe size;

b) Nominal pressure rating;

c) Symbol for metal winding material;

d) Temperature limitation; and

e) Manufacturer's identification mark.

7.2 The metal winding material shall have a code as in Table 2 which shall be used for identification.

Example:

250 — 10
07Cr19Ni9

7.3 A gasket suitable for more than one class rating shall have the maximum applicable rating stamped on the centering ring.

Example:

250 — 175
07Cr19Ni9

7.4 The spiral wound gaskets without centering ring (for male and female spigot and tongue and groove types) and refill gaskets (for those with centering ring) shall have a colour code identification to indicate the material of metal winding and the class rating as given in Tables 2 and 3.

7.5 The manner of colour coding to be applied for gaskets mentioned in **7.4** shall be as follows:

a) For normal pressure rating — By dyeing the asbestos filler with appropriate colour, and

b) For metal winding material — Colour on the outer periphery of metal winding.

7.6 *ISI Certification Marking* — Details available with the Indian Standards Institution.

TABLE 3 COLOUR CODE FOR CLASS RATING

(*Clause* 7.4)

Class Rating (1)	Colour Code (2)
10	Yellow
20	Red
40	Green
60	Black
100	White
175	Blue

8. Inspection

8.1 The purchaser or his representative shall have free access at all reasonable times to those parts of the manufacturer's works actually engaged upon his contract and shall be at liberty to inspect at any stage of manufacture the materials covered by such contract. He shall be at liberty to reject any material which does not comply with the requirements of this standard.

9. Information to be Supplied by the Purchaser

9.1 It is recommended that the following information be supplied by the purchaser in the enquiry or order. If the purchaser requires fittings which deviate from this standard such deviating requirements should be stated in the purchase order:

a) Nominal pipe size and nominal pressure rating,
b) With or without centering ring when intended for refill purposes,
c) Material required for metallic winding,
d) Operating pressure, temperature and fluid,
e) Material required for filler,
f) Flange particulars, and
g) Any other special requirement.

APPENDIX A

(*Clause* 1.2)

ALTERNATE GASKET AND CENTERING RING SIZES

A-1. The gasket and centering ring sizes to suit pipes and flanges to DIN specifications are given below for information only.

All dimensions in millimetres.

Nominal Pipe Size	Inner Diameter of Gasket for	Outer Diameter of Gasket for		Outer Diameter of Centering Ring for						
	NP 1.0-16.0	NP 1.0-4.0	NP 6.4-16.0	NP 1.0	NP 1.6	NP 2.5	NP 4.0	NP 6.4	NP 10.0	NP 16.0
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
10	24	36	36	48	48	48	48	—	58	—
15	28	40	40	53	53	53	53	—	63	—
20	34	47	48	63	63	63	63	—	74	—
25	41	55	56	73	73	73	73	—	84	—
32	50	66	67	84	84	84	84	—	90	—
40	56	72	74	94	94	94	94	—	105	—
50	68	86	88	109	109	109	109	115	121	121
65	84	103	106	129	129	129	129	140	146	146
80	97	117	120	144	144	144	144	150	156	156
100	123	144	148	164	164	170	170	176	183	183
125	148	170	174	194	194	196	196	213	220	220
150	177	200	205	220	220	226	226	250	260	260
175	200	224	231	250	250	256	268	280	290	287
200	229	255	263	275	275	286	293	312	327	327
250	283	310	319	330	331	343	355	367	394	391
300	332	360	369	380	386	403	420	427	461	461
350	375	405	413	440	446	460	477	489	515	—
400	426	458	466	491	498	517	549	546	575	—
500	528	566	572	596	620	627	631	660	708	—
600	635	675	683	698	737	734	750	768	819	—

A-2. In place of the six class ratings given in BS 1560, DIN standard specifies seven nominal pressure rating groups, namely, 1 MPa, 1·6 MPa, 2·5 MPa, 4·0 MPa, 6·4 MPa, 10 MPa and 16 MPa.

EXPLANATORY NOTE

The metallic spiral wound gaskets covered under this specification are suitable for pressures up to 17·5 MPa and temperatures up to 1 030°C involving contact with steam, water, oil or non-reactive gases. In the preparation of this standard assistance has been derived from BS 3381-1973 'Metallic spiral wound gaskets for use with flanges to BS 1560, Parts 1 and 2' issued by the British Standards Institution. Appendix A contains gasket and centering ring sizes to suit pipes and flanges to DIN specifications for information only.

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